

IN THE CLAIMS:

This listing of claims will replace all prior versions, and listings, of claims in the application.

1. (currently amended) An optical ~~Optical~~ sensor element (10), ~~in which there is~~ comprising ~~a light sensitive area (18)~~ in a semiconductor substrate (1) comprising:
 a light sensitive area (18) in which ~~by illumination~~ charge carriers are releasable upon illumination, and
 two doping zones (15, 16) for receiving charge carriers released from the light sensitive area (18), ~~as well as~~
 an electrode (13, 14) insulated against the light sensitive area (18) for production of a field gradient in the light sensitive area (18), ~~thereby characterized, that~~
 wherein the insulated electrodes (13, 14) are provided in grooves formed in the surface of the substrate (1).
2. (currently amended) An optical ~~Optical~~ sensor element according to Claim 1, wherein ~~thereby characterized, that~~ each doping zone (15, 16) contacts an ~~one~~ insulation layer (12) of one of the insulated electrodes (13, 14).
3. (currently amended) An optical ~~Optical~~ sensor element according to Claim 1 ~~or 2~~, wherein ~~thereby characterized, that~~ at each doping zone (15, 16) an ohmic contact is formed.

4. (currently amended) An optical ~~Optical~~ sensor element according to Claim 1 ~~one of the preceding Claims, wherein~~ ~~thereby characterized, that~~ the depth of the grooves is greater than the thickness of the doping zones (15, 16).
5. (currently amended) An optical ~~Optical~~ sensor element according to Claim 1 ~~one of the preceding Claims, wherein~~ ~~thereby characterized, that~~ the depth of the grooves is between 5 and 40 μm , ~~preferably between 2 and 25 μm deep.~~
6. (currently amended) An optical ~~Optical~~ sensor element according to Claim 1 ~~one of the preceding Claims, wherein~~ ~~thereby characterized, that~~ each doping zone (15, 16) is associated with a collection condenser for collection of charge carriers extracted from the doping zone (15, 16).
7. (currently amended) An optical ~~Optical~~ sensor element according to Claim 6, wherein ~~thereby characterized, that~~ each collector condenser includes two conductive plates, which are provided in the grooves of the substrate.
8. (currently amended) An optical ~~Optical~~ sensor element according to Claim 1 ~~one of the preceding Claims, wherein~~ ~~thereby characterized, that~~ in place of insulated electrodes (13, 14) of metal semiconductors structures

(31), built up electrodes are present, which form Schottky barriers (30) adjacent to to the light sensitive area (18).

9. (currently amended) An optical ~~Optical~~ sensor element according to Claim 8, wherein ~~thereby characterized, that~~ the sensor element does not include any doping zones (15, 16).
10. (currently amended) An optical ~~Optical~~ sensor element according to Claim 1 ~~one of the preceding Claims, wherein~~ ~~thereby characterized, that~~ on the surface of the light sensitive area (18) an ohmic p⁺-contact (32) is diffused in.
11. (currently amended) An optical ~~Optical~~ sensor array with a plurality of sensors according to Claim 1 ~~one of the preceding Claims, wherein~~ ~~thereby characterized, that~~ respectively two sensor elements (10) adjacent in a first direction are provided on two sides of a common insulated electrode (13').
12. (currently amended) An optical ~~Optical~~ sensor array according to Claim 11, wherein ~~thereby characterized, that~~ the common insulated electrode (13') bordering doping zones (15, 16) of the two sensor elements (10) are connected electrically conductively.

13. (currently amended) An optical ~~Optical~~ sensor array according to Claim 12, wherein ~~thereby characterized, that~~ the two sensor elements (10) are joined or combined into a pixel.
14. (currently amended) An optical ~~Optical~~ sensor array according to Claim 11, wherein ~~thereby characterized, that~~ the doping zones (15, 16) bordering the common insulated electrode (13') of the two sensor elements (10, 10') are insulated electrically from each other.
15. (currently amended) An optical ~~Optical~~ sensor array according to Claim 14, wherein ~~thereby characterized, that~~ the insulating layer (12) of one of the insulated electrodes (13, 14) is thicker at the floor (26) of its groove than at its side walls (27).
16. (currently amended) An optical ~~Optical~~ sensor array with a plurality of sensors according to Claim 1 ~~one of Claims 1 through 7, wherein thereby characterized, that~~ in between two adjacent insulated electrodes (13, 14) of two in a first direction adjacent sensor elements (10), a zone (28) is formed insulating one of the electrodes (13, 14) is ~~formed of against each other insulating zone (28).~~
17. (currently amended) An optical ~~Optical~~ sensor array according to Claim 16, wherein ~~thereby characterized, that~~

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the insulating zone (28) is formed by the semiconductor substrate (1) or a groove.

18. (new) An optical sensor element according to Claim 5, wherein the depth of the grooves is between 2 and 25 μm deep.